NASA TT F-10,229

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K. Ya. Kondrat'yev, Z. F. Mironova and A. N. Otto

Translation of "Spektral'noye al'bedo yestestvennykh podstilayushchikh poverkhnostey." Problemy Fiziki Atmosfery. Issue 3, Izdatel'stvo Leningradskogo Universiteta, Leningrad, pp. 24-47, 1965

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
WASHINGTON JULY 1966

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ABSTRACT

The authors give the results of recent measurements of albedo from various natural surfaces: agricultural crops, soil, snow, water, etc. The data are used for compiling tables of spectral albedo for individual days as well as the averages for several days. Curves are given showing the spectral characteristics of albedo from the various types of surfaces. The data given in this article are basically from measurements under clear weather conditions. More observations under varying conditions of illumination are needed for a better understanding of the factors involved in changes of albedo from natural underlying surfaces.

Some preliminary data were given in references 1 and 2 on the spectral /24* albedo of natural underlying surfaces. The present paper contains an analysis of more recent data recorded for an extensive variety of underlying surfaces in various climatic regions of the European territory of the USSR.

The spectral albedo of these natural underlying surfaces was measured by means of a remotely controlled field unit which was considerably modernized

*Numbers given in margin indicate pagination in original foreign text.

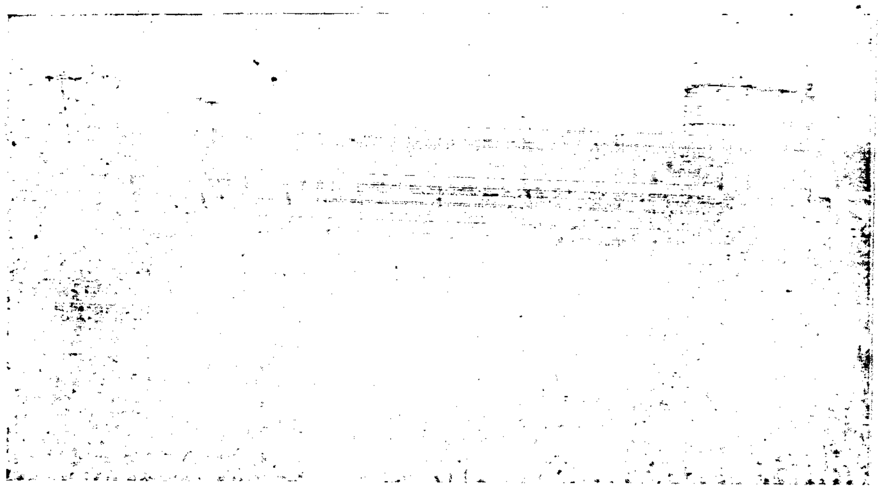

Figure 1. Overall view of the remote-control field installation and the field laboratory mounted on a GAZ-63 tractor.

in comparison with the previously described installation (ref. 2). An overall view of this unit is shown in figure 1. The measurement program was planned and carried out to give a variety of protracted observations for studying the basic rules and factors involved in the change of spectral albedo from several typical surfaces. The most detailed measurements were made over alfalfa fields in the Tairovo settlement of the Odessa Oblast. The observations were made on 20 clear days with 12-13 series of diurnal measurements. The surfaces of vineyards, fallow (the bare surface of plowed soil), dry grass and corn were studied at this same point.

Measurements were made above agricultural crops in the Poltava Oblast, above the surface of clover, lupine and water in the Lithuanian SSR, and above the surfaces of snow, asphalt and concrete in the Leningrad Oblast. Measurements were made for two or three days above these surfaces to obtain data on the most typical characteristics of the spectral albedo. All the surfaces which we studied were divided into three categories according to the spectrophotometric classification proposed by Ye. L. Krinov (ref. 3).

The first category includes surfaces for which the albedo increases from the shortwave to the longwave spectral region. More specifically with an increase in wavelength from 400 to 1000 mμ. In this class are various types of soil, roads and many other objects. /25

The second category includes surfaces for which the albedo has a maximum in the visible region of the spectrum (around 550-560 mμ), a minimum in the 650-680 mμ region and high values in the 730-1000 mμ region. All types of vegetation belong in this category.

The third class includes surfaces for which the albedo is precisely constant in the 500-800 mμ wavelength range, but decreases on both sides of this range (400-500 and 800-1000 mμ). This category includes snow and water surfaces.

Albedo measurement data for individual periods of observations are given in the table (see appendix). Also given there are averaged (mean daily and "mean meteorological") albedo values.

The mean daily values of albedo A_1 were calculated as the arithmetical means from data for periods which were situated symmetrically with respect to true noon. The "mean meteorological" values of albedo A_2 were determined from data for three periods of measurements (9, 12 and 15 hours). The relative error for albedo values reduced to these periods was less than 5 percent. The working spectral width of the slit was 10-120 Å for the limits of the 450-900 mμ wavelength range respectively. /26

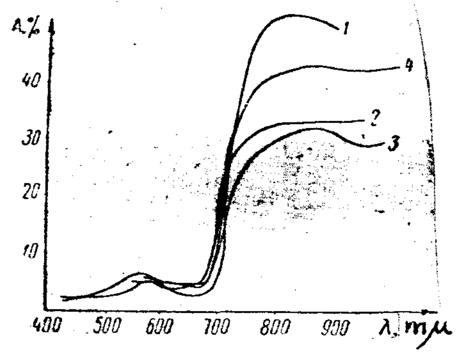

Figure 2. Mean daily values of spectral albedo for several types of vegetation. 1, Sudan grass; 2, corn; 3, alfalfa (July); 4, alfalfa (June).

Vegetative Cover

All types of green vegetative cover which we studied in the state of closed herbage have similar spectral albedo characteristics in the 420-900 mμ wavelength range. The spectral albedo increases somewhat for all vegetative cover during the transition from λ = 420 mμ to λ = 550 mμ. A further increase in wavelength resulted in a reduction in albedo due to the main absorption band of chlorophyll (650-680 mμ). There is a sharp increase in albedo beginning with a wavelength of λ = 700 mμ and upward. The maximum albedo falls in the 720-1000 mμ spectral region. There is either practically no change in the albedo in this section, or somewhat of a reduction in the region from λ = 850 mμ to λ = 1000 mμ.

The value of the albedo varies for each type of vegetative cover. Spectral characteristics of albedo are given in figure 2 for several types of vegetation. The average values of albedo for individual groups of plants are given in table 1.

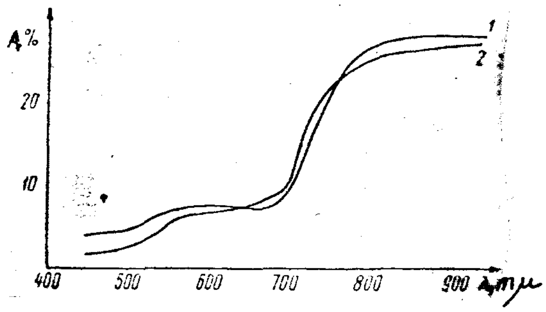

Figure 3. Mean daily spectral albedo of crops. 1, Tall corn; 2, sunflowers.

The table shows the main differences in albedo to be at wavelengths of 700-730 mμ (from 6 to 20 percent). These changes reach 20 percent in the 750-900 mμ wavelength range.

The effect of the chlorophyll absorption shows up clearly for herbaceous covers with lush vegetation (alfalfa in June, Sudan grass, lupine and cabbage); a sharp change in albedo takes place in the 700-730 mμ spectral region: $\Delta A = A_{730} - A_{700} =$ 16-22 percent. The albedo is 40-50 percent in the 750-900 mμ wavelength region. The chlorophyll absorption band is also well defined for herbaceous covers in the month of July (clover, alfalfa, corn for silage, beets); however, the change in albedo in the 700-730 mμ is less pronounced, amounting to $\Delta A = A_{730} - A_{700} =$ 10-12 percent. The albedo comes to 28-30 percent in the 730-900 mμ wavelength range.

The chlorophyll absorption band does not show up as well for surfaces /27 with vegetation 110-140 cm high during ripening (corn, sunflowers). The albedo in the 450-700 mμ spectral region is 3-4 percent higher than for the first two groups of vegetation (see fig. 3). The albedo is 28-30 percent in the 780-900 mμ wavelength range.

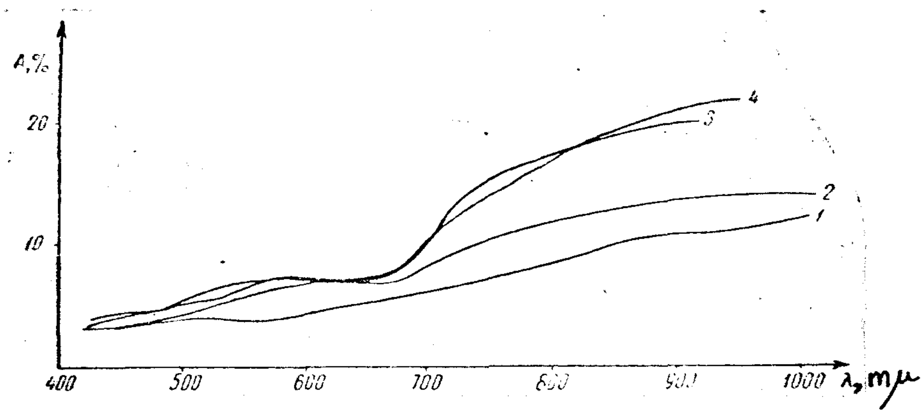

Figure 4. Average daily values of spectral albedo for surfaces with rarely planted vegetation and fallow. 1, Fallow; 2, vineyard (annual); 3, mowed surface of a meadow; 4, young winter wheat.

All characteristics which are typical of thick herbage also show up to a lesser degree in surfaces with rarely planted vegetation (young winter wheat, the mowed surface of a meadow, the soil after melting of snow with last year's grass and annual grapes in which the green mass is approximately 10 percent of the total soil area (figure 4)). The change in albedo in the 700-730 mμ /29 spectral region is 2-3 percent; the albedo is 10-20 percent in the 750-900 mμ wavelength region. The average values of the albedo for these surfaces are given in table 2 together with the albedo for plants in the herbage stage and the ratio of these values to the albedo for dry chernozem(black earth).

The table shows that even a small amount of vegetation (annual grapes) results in a considerable change in albedo, which is especially pronounced beginning at a wavelength of 700 mμ.

Corn may be used as an example for tracing the change in spectral albedo as a function of vegetation phases (fig. 5).

TABLE 1. AVERAGE VALUES OF ALBEDO FOR VARIOUS GROUPS OF PLANTS

Plants and their albedo	Wavelength λ, mμ													
	550	575	600	625	650	675	700	710	725	750	775	800	850	900
Alfalfa (June) lupine A_1	7,4	6,3	[illegible]	[illegible]	4,8	4,6	10,8	20	31	40	42	43	45	45
A_2	7,4	5,7	[illegible]	[illegible]	4,4	4,3	10,9	19,6	29	40	41	40	43	42
Sudan grass A_1	6,0	6,4	[illegible]	[illegible]	3,6	3,4	5,8	[illegible]	[illegible]	[illegible]	[illegible]	51	62	50
A_2	6,0	6,4	4,7	3,7	3,4	3,2	5,8	[illegible]	[illegible]	[illegible]	[illegible]	51	51	50
Alfalfa (July) A_1	5,5	5,6	4,9	4,9	4,8	4,7	8,5	13,5	19,3	27	30	32	34	33
Clover and silage corn A_2	3,9	5,0	5,0	4,4	4,5	4,8	8,6	12,7	18,1	25	28	30	30	32
Sunflowers and tall corn A_2	4,7	6,9	7,3	7,7	7,6	7,7	7,2	10,4	13,7	19,3	24	26	28	28

TABLE 2. AVERAGE VALUES OF ALBEDO FOR A SURFACE WITH RARELY PLANTED VEGETATION AND FOR PLANTS IN THE HERBAGE STAGE, AND THE RATIO OF THESE VALUES TO THE ALBEDO OF DRY CHERNOZEM A_1, %

Surfaces and their albedo	Wavelength λ, mμ													
	450	475	500	550	600	650	675	700	710	725	750	800	850	875
Dry chernozem A_1	3,1	3,4	3,7	4,3	4,6	5,2	5,6	6,0	6,2	6,5	6,9	8,2	9,6	10,2
Annual grapes A_2	3,3	3,8	4,2	5,5	7,1	6,5	6,9	8,1	8,6	9,5	10,2	11,7	12,7	13,2
Rarely planted vegetation surface A_3	4,1	4,6	4,8	6,4	6,9	7,2	7,4	10,0	11,5	13,0	14,5	17,0	19,2	19,8
Closed herbage stage vegetation A_4	2,6	3,0	3,2	5,5	4,9	4,8	4,7	8,8	13,5	19,3	27	32	34	34
A_2/A_1	106	112	114	128	154	125	123	[illegible]	[illegible]	146	148	143	132	129
A_3/A_1	132	132	129	149	150	138	132	167	185	200	210	207	200	194
A_4/A_1	84	88	86	128	106	92	84	142	218	297	391	390	364	383

NOTE: Commas in all tables represent decimal points.

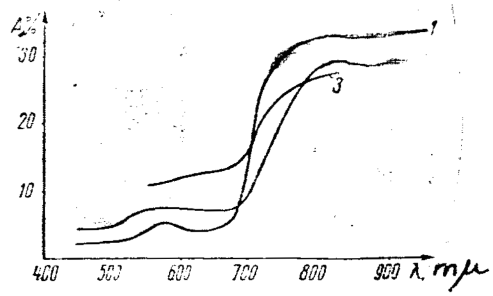

Figure 5. Daily average values of spectral albedo for corn in various phases of growth. 1, Silage; 2, tall; 3, yellow.

This figure shows a change in the profile for the chlorophyll absorption band (and a 3-4 percent increase in albedo for the 450-680 mμ as the plant grows--during the transition from silage to tall green corn. There is a considerable reduction in the albedo in the 750-850 mμ wavelength range. During ripening of the corn (as it becomes yellow) there is a further increase in the albedo in the 550-730 mμ spectral region and the chlorophyll absorption band disappears.

Since there is a considerable diurnal variation in albedo, a study of the average daily values is of considerable interest. This problem was first considered by K. S. Shifrin (ref. 4), and conversion factors were derived somewhat later by Kh. G. Tooming (ref. 5) for calculating the average daily integral albedo. A considerable quantity of statistical data is necessary for finding these conversion factors. We have made an attempt to compile a table of conversion factors K (the ratio of the average albedo to the albedo of the observational period) for the 550-975 mμ wavelength range from measurement data above alfalfa for 20 clear days (table 3).

These factors may differ by ±10 percent for individual spectral regions.

TABLE 3. CONVERSION FACTORS K FOR VARIOUS SOLAR ELEVATIONS ($h_{\odot}$)

$h_{\odot}$, deg	K June	K July	$h_{\odot}$, deg	K June	K July
21—23	0,86	0,95	63—61	1,09	—
25—29	0,89	0,95	56—52	1,10	1,10
32—34	0,95	1,00	47—43	1,04	1,00
37—40	0,98	1,05	40—37	1,00	0,98
43—47	1,02	1,13	34—32	0,96	0,94
52—56	1,05	1,22	29—25	0,93	0,84
61—63	1,08	1,27	23—21	0,89	0,80
66	1,13	—	—	—	—

Table 3 shows that the average daily albedo for July before noon corresponds to the albedo measured at solar elevations of 32-34°, while the range for June is 40-43°; the corresponding ranges for the afternoon are 37-40° for June and 43-47° for July. /30

All the types of vegetative cover which we studied have a diurnal variation in albedo with a minimum at noontime for clear days. Changes in albedo of alfalfa for the month of June are given in table 4 as a function of solar elevation with respect to true noon. This table shows that the diurnal variation in albedo for the month of June is symmetric with respect to noon and may vary by 30-40 percent as the solar elevation changes from 26 to 66°.

The diurnal variation of the same surface is asymmetric for the month of July (fig. 6); the afternoon values of albedo are 10-15 percent higher than the forenoon values (for solar elevations of 30-18°) and the albedo varies by 50-60 percent with a change in solar elevation from 24 to 62°. /31

TABLE 4. DIURNAL VARIATION IN THE RELATIVE VALUES OF SPECTRAL ALBEDO FOR ALFALFA (THE ALBEDO AT A SOLAR ELEVATION OF 66° IS TAKEN AS THE UNIT)

Wavelength, mμ	$h_\odot$, deg												
	26	32	36	47	56	63	66	63	56	47	36	32	26
625	128	125	115	100	115	111	100	109	109	109	109	144	140
700	100	95	93	102	106	98	100	93	92	95	97	100	104
750	132	126	129	115	103	103	100	103	103	102	123	123	126
800	131	128	121	108	105	105	100	100	102	108	121	118	128
850	136	123	123	115	107	102	100	102	105	110	123	123	131
900	136	118	125	113	108	103	100	100	103	110	121	121	128

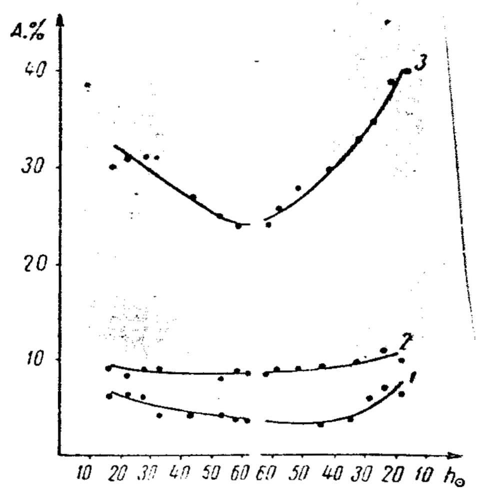

Figure 6. Diurnal variation in the spectral albedo for alfalfa (July 1961, Tairovo settlement).

1, λ = 660 mμ; 2, λ = 700 mμ; 3, λ = 800 mμ.

Snow and Water Surfaces

The albedo of snow cover is extremely variable in contrast to that of other surfaces. This variation in albedo depends both on changes in the surface itself and on conditions of illumination. It should be pointed out that a visual

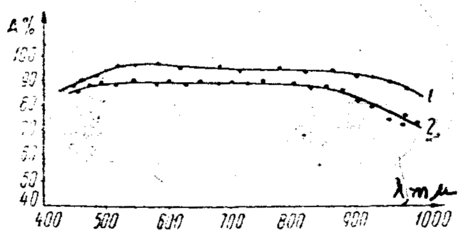

Figure 7. Spectral characteristics of the albedo for a snow surface during clear weather (22 February 1963).

1, 10 hours; 2, 12 hours.

scale is used to determine the state of the snow cover. However, the reading of this scale should not be used to judge the change in physical properties of the snow. These circumstances make it difficult to explain the reasons for variability in the albedo of snow.

Our studies above the snow surface were used as a basis for compiling tables of the spectral albedo for individual measurement days and of the mean meteorological values of albedo calculated as the averages from data for several measurement days (see appendix).

Curves are given in figure 7 for the albedo of freshly fallen dry snow as a function of wavelength in clear weather. In the interval of wavelengths from λ = 420 mμ to λ = 500 mμ, the albedo increases by $\Delta A = A_{500}$ mμ - A_{420} mμ $\simeq$ 5-9 percent. There is an insignificant change in albedo values (1-3 percent) in the 500-800 mμ spectral range. Beginning at λ = 800 mμ and continuing to λ = 1000 mμ there is a reduction in albedo by $\Delta A = A_{1000}$ mμ - A_{800} mμ = /32
5-12 percent.

The albedo of wet snow shows little change in the 420-800 mμ wavelength region during clear weather. The change in albedo in the 800-1000 mμ spectral

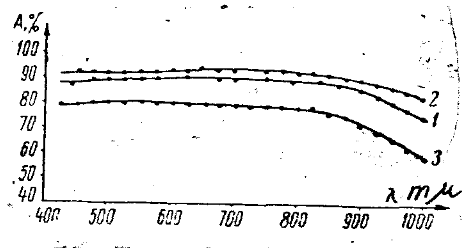

Figure 8. Spectral characteristics of the albedo for a snow cover during clear weather (29 March 1963, Sablino settlement). 1, 9 hours; 2, 11 hours; 3, 15 hours.

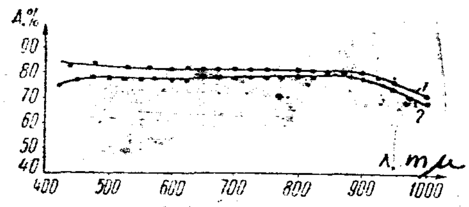

Figure 9. Spectral characteristics of the albedo for a snow surface during an overcast of 10/10 st (28 February 1963). 1, 9 hours; 2, 12 hours.

region is more pronounced than for dry snow, being ΔA_{1000} mμ - A_{800} mμ = 16-18 percent (fig. 8).

The albedo for freshly fallen snow during overcast weather has a flatter spectral curve. In this case the change in albedo in the 425-950 mμ wavelength range is 6-8 percent (fig. 9).

The spectral albedo for many types of snow surface varies only slightly in the 500-800 mμ wavelength range. The principal changes take place in the 800-1000 mμ range. The change in albedo in this spectral region is considerably dependent on the moisture content of the snow.

Figure 10 shows the spectral albedo of a water surface measured above a lake where the bottom was about 60-70 cm deep. Characteristic for the water surface in this case are slight changes in the albedo throughout the 420-850 mμ wavelength region. The spectral change in albedo is less than 4 percent.

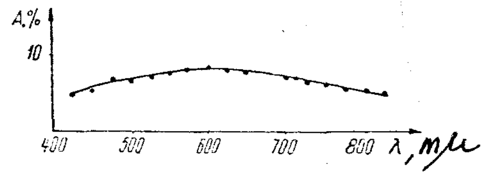

Figure 10. Spectral characteristics of the albedo for a water surface.

The diurnal variation in the albedo of water has a pronounced mirror- /33 reflection nature with a minimum at noontime. As the solar elevation decreases from 58 to 28^{o}, the albedo increases by a factor of 2-2.5 in comparison with the value for true noon.

Soils, Rock Outcropping, Road Surfaces

Surfaces belonging to the first category (fig. 11) show a continuous increase in albedo as the wavelength varies from 500 to 1000 mμ.

Given below are changes in the albedo for various surfaces in the 500-900 mμ wavelength region.

Surface	Albedo, %
Fallow	3-13
Concrete	12-25
Asphalt	13-24
Dirt road	9-27
River sand	36-54
Straw	10-40
Dry grass	6-29
Grain stubble	6-30

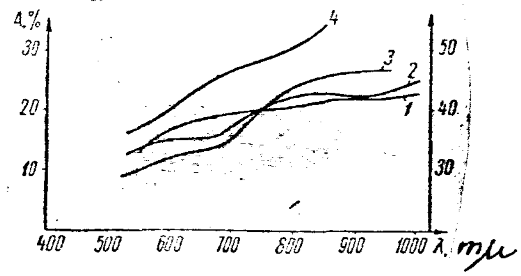

Figure 11. Spectral characteristics of albedo.

1, Asphalt; 2, concrete; 3, road; 4, sand.

Investigation of a large number of surfaces in the first category will give a basis for grouping them according to types as was done in reference 3.

Data are given in the present paper on the spectral albedo for various surfaces in the 450-975 mμ wavelength range derived basically from observations under clear weather conditions. Studies of albedo will be made in the future for a wider range of wavelengths under varying illumination conditions and the average albedo will be found for various types of surfaces.

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APPENDIX. MEASUREMENT RESULTS FOR SPECTRAL ALBEDO OF VARIOUS NATURAL SURFACES

Date + cloud cover	Mean solar time	Solar elevation + average albedo	Surface	Wavelength λ, mμ 425	450	475	500	525	550	575	600	625	650	675	700	710	725	750	775	800	850	875	900	950	975	1000	Integral albedo
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
VI 1961 Clear	7^{00}	26°–30°00′	Alfalfa	—	—	—	—	—	9,0	7,0	6,5	5,8	5,0	4,5	11,0	22,8	35	16	49	50	53	63	53	50	50	49	—
	7^{30}	32 00		—	—	—	—	—	7,6	7,0	6,0	5,6	4,7	4,3	10,5	18,7	34	43	46	49	48	50	46	51	—	41	—
	8^{00}	36–37 00		—	—	—	—	—	7,1	6,3	5,5	5,2	4,6	4,2	10,2	21,0	33	44	46	46	48	48	49	48	49	50	—
	9^{00}	47 00		—	—	—	—	—	—	5,3	4,9	4,5	4,2	4,2	11,3	20,8	31	39	46	41	45	45	44	44	45	46	—
	10^{00}	56 15		—	—	—	—	—	6,5	5,6	5,2	5,1	4,8	4,6	11,7	20,7	31	35	42	40	42	44	42	42	42	41	—
	11^{00}	63 30		—	—	—	—	—	5,5	5,3	5,0	5,0	4,9	4,8	10,9	19,6	28	35	39	40	40	40	40	39	39	40	—
	12^{00}	66 00		—	—	—	—	—	6,4	5,6	5,4	4,5	4,5	4,4	11,0	18,9	26	34	38	38	39	39	39	39	39	40	—
	13^{00}	63 30		—	—	—	—	—	6,5	5,7	5,1	4,9	4,8	4,8	10,2	18,8	28	35	36	38	40	40	39	39	40	39	—
	14^{00}	56 15		—	—	—	—	—	7,4	5,1	4,9	4,9	4,6	4,5	10,1	19,0	28	35	37	39	41	41	40	40	41	41	—
	15^{00}	47 00		—	—	—	—	—	6,7	6,1	5,1	4,9	4,5	4,4	10,5	19,2	30	35	38	41	44	44	43	43	43	44	—
	16^{00}	37–36 00		—	—	—	—	—	10,6	8,7	7,2	6,5	5,2	4,8	10,7	19,7	31	42	40	45	48	48	47	48	48	48	—
	16^{30}	32 00		—	—	—	—	—	—	—	7,9	—	5,7	5,3	11,0	20,2	34	42	41	45	48	48	47	46	46	46	—
	17^{00}	26–30 00		—	—	—	—	—	7,4	8,3	7,2	6,3	5,1	4,7	11,4	21,1	33	45	44	49	51	51	50	50	48	48	—
		A_1		—	—	—	—	—	7,4	6,3	5,8	5,3	4,8	4,6	10,8	20,0	31	40	42	43	45	46	45	44	44	44	—
		A_2		—	—	—	—	—	—	5,7	5,1	4,6	4,4	4,3	10,9	19,6	29	36	41	40	43	43	42	42	42	43	—
VII 1961 Clear	6^{00}	18°20′		—	—	—	—	—	6,4	7,2	6,0	5,6	5,2	4,8	9,0	13,8	20,0	25	28	30	31	32	32	32	—	—	—
	7^{00}	23 30		—	—	—	—	—	6,0	7,3	6,5	5,8	5,5	5,2	8,5	14,0	20,5	26	29	31	35	35	35	34	35	38	—
	7^{30}	28 40		—	—	—	—	—	7,1	6,7	6,1	5,6	5,4	5,0	8,9	14,2	20,7	27	29	31	34	35	31	33	31	36	—
	8^{00}	33 40		—	1,7	—	2,0	—	6,2	5,7	4,2	5,4	5,2	4,8	9,2	14,5	21,0	27	29	31	34	34	34	31	32	35	—
	9^{00}	43°45′		—	1,4	—	1,7	—	5,8	5,5	4,3	4,5	4,5	5,0	8,5	14,0	19,0	23,5	26	27	30	31	30	28	29	31	—
	10^{00}	52 30		—	1,3	—	1,6	—	5,5	5,1	4,2	4,8	4,6	4,8	8,0	12,5	17,5	21,8	24,0	25	27	27	35	25	26	26	—
	11^{00}	59 30		—	1,3	—	1,5	—	4,7	4,4	3,7	5,0	5,1	5,3	8,7	11,0	16,2	20,2	22,5	24	27	28	24	24	25	25	—
	12^{00}	61 40		—	1,1	—	1,4	—	4,5	4,2	3,6	4,0	5,0	5,5	8,5	12,0	17,0	21,2	22,3	21	25	24	23	23	24	26	—
	13^{00}	59 30		—	1,0	—	1,4	—	4,7	4,3	3,5	6,0	6,0	6,0	9,0	13,5	19,0	23,0	25	26	29	30	28	24	25	25	—
	14^{00}	52 30		—	1,0	—	1,5	—	4,2	4,0	3,5	6,0	6,0	6,0	9,2	11,2	19,2	24,0	26	28	31	32	23	29	30	31	—
	15^{00}	43 45		—	0,9	—	1,6	—	4,8	4,4	3,6	6,0	6,0	6,0	9,5	15,0	19,5	25	28	30	33	31	35	35	36	36	—
	16^{00}	33 40		—	0,7	—	1,7	—	5,4	4,8	3,7	6,0	6,0	6,0	9,7	16,4	22,2	28	30	33	36	37	36	36	37	37	—
	16^{30}	28 40		—	—	—	—	—	6,0	6,0	6,0	6,0	6,0	6,0	10,0	17,8	25	30	33	35	39	39	38	37	38	38	—
	17^{00}	23 30		—	—	—	—	—	7,0	6,5	7,1	6,7	6,1	5,6	11,2	18,6	24,0	33	38	39	41	42	41	42	43	—	—
	17^{30}	18 20		—	—	—	—	—	8,7	8,0	6,5	6,2	6,1	5,6	10,0	19,4	29	34	37	40	45	45	43	41	—	—	—
		A_1		—	—	—	—	—	5,8	5,6	4,8	5,6	5,5	5,4	9,2	14,9	20,6	26	29	30	33	34	33	32	32	32	—
		A_2		—	—	—	—	—	5,1	4,7	3,8	4,8	5,2	5,8	8,8	13,7	18,8	23,2	25	27	29	30	29	29	30	31	—
VII 1963 Clear	8^{00}	34°12′	Clover	—	2,2	2,8	2,9	3,5	4,3	4,8	4,3	4,0	3,8	4,0	9,0	15,0	22,0	25	30	32	35	35	—	—	—	—	—
	9^{00}	42 21		—	—	—	—	3,6	4,2	4,5	4,0	4,0	3,9	4,0	8,5	12,0	20,0	24,0	27	31	33	34	—	—	—	—	18,3
	10^{00}	40 30		—	—	—	—	3,8	4,2	4,2	4,0	4,0	4,0	3,8	7,0	10,0	18,0	23,0	26	28	32	33	34	35	35	—	18,0
	11^{00}	51 30		—	—	—	—	4,3	5,0	4,8	4,0	3,8	3,6	3,2	8,0	12,0	19,0	24,0	27	29	30	30	31	32	33	—	17,3
	12^{00}	55 24		—	—	2,1	2,3	4,0	4,1	4,0	3,8	3,6	[illegible]	3,3	6,0	10,3	18,0	22,0	25	26	28	28	29	30	30	—	16,0
	13^{30}	51 30		—	—	2,1	2,1	3,7	4,2	5,2	[illegible]	[illegible]	3,8	4,3	8,0	13,0	18,0	23,0	27	30	32	33	33	31	31	—	16,5
	14^{00}	49 30		—	2,2	2,4	3,0	3,2	3,8	4,9	4,5	4,0	4,0	5,0	8,0	13,0	18,0	25	29	31	33	31	31	31	31	—	17,0
	15^{00}	42°24′		—	—	2,0	2,0	3,4	4,6	5,4	5,1	4,8	4,8	[illegible]	9,0	13,0	18,0	24,0	31	33	31	34	—	—	—	—	17,8
	16^{00}	34 12		—	—	—	—	4,3	5,6	5,6	4,8	4,0	4,0	[illegible]	9,0	15,0	21,0	27	31	32	35	35	—	—	—	—	18,9
	17^{00}	25 30		—	2,0	2,0	2,4	4,4	4,6	5,2	5,0	4,5	5,0	5,3	12,0	14,0	21,0	27	31	33	35	35	—	—	—	—	—
	18^{00}	17 27		—	—	3,8	4,0	5,0	8,7	8,5	7,5	7,2	7,0	7,0	14,0	16,0	25,0	33	38	40	43	43	—	—	—	—	—
		A_1		—	—	—	—	3,8	4,5	4,8	4,3	4,0	3,9	4,1	8,1	12,5	19,0	24,0	28	30	32	33	—	—	—	—	—
		A_2		—		—	—	3,7	4,3	4,6	4,3	4,1	3,9	4,1	7,8	11,8	18,6	23,4	28	30	32	32	—	—	—	—	—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
VIII 1963	8^{00}	28°24′	Cabbage	7,6	7,6	7,4	7,9	9,4	11,0	11,8	11,0	9,0	7,8	8,2	11,0	23,0	34	43	46	47	48	47	45	42	—	—	[illegible]
Clear	9^{00}	37 24		6,6	6,4	6,6	7,0	8,4	7,4	9,9	10,4	10,0	9,0	8,2	13,0	22,0	29	38	42	44	45	44	43	40	—	—	19,2
3 3 Cu	10^{00}	45 30		8,2	8,5	8,8	9,4	10,6	12,4	13,0	13,0	12,0	11,0	9,0	14,0	23,0	31	39	43	44	46	45	44	40	—	—	18,3
3 3 Cu	11^{00}	50 30		6,0	5,8	6,0	6,8	7,0	8,0	9,0	9,4	8,6	7,6	9,0	13,0	23,0	30	37	41	42	41	43	44	41	—	—	18,9
2 2 Cu	12^{00}	52 36		7,0	7,2	7,4	8,5	9,4	10,3	10,4	10,0	9,0	8,0	8,6	14,0	23,0	33	39	42	44	43	44	42	—	—	—	18,5
Clear	13^{00}	50 30		—	—	—	—	8,1	11,0	13,0	13,6	12,0	10,5	9,0	16,0	23,0	33	40	47	48	49	48	47	43	—	—	19,0
	14^{00}	45 30		—	—	—	—	10,0	13,0	13,0	12,0	10,5	10,0	9,0	15,0	24,0	34	44	49	51	—	—	—	—	—	—	19,0
	15^{00}	37 24		—	—	—	—	11,0	14,0	4,5	12,5	11,6	10,5	10,0	16,0	22,0	32	43	47	48	49	48	48	44	—	—	18,8
	16^{00}	28 24		—	—	—	—	10,0	12,0	13,0	13,0	12,0	11,0	10,5	18,5	23,0	36	47	53	55	55	54	52	46	—	—	19,2
		A_1		7,1	7,1	7,2	7,9	9,3	11,0	12,0	11,6	10,6	9,5	8,0	16,0	20,0	32	41	46	47	42	41	40	33	—	—	—
		A_2		—	—	—	—	9,6	10,6	11,6	11,0	10,2	9,2	8,9	14,3	22,3	31	44	44	46	46	46	44	43	—	—	—
VIII 1963	9^{00}	39°51′	Maple	2,8	3,0	3,0	3,0	4,0	4,6	4,6	4,6	4,0	3,6	3,6	6,0	8,0	13,0	21,0	24,0	25	—	—	—	—	—	—	12,4
Clear	10^{00}	43 18		2,2	2,6	2,8	2,8	3,6	4,0	4,0	4,0	4,0	4,0	3,8	7,0	10,0	16,8	20,8	23,3	24,2	—	—	—	—	—	—	12,3
	11^{00}	48 36		2,8	3,4	3,6	4,0	4,2	5,0	5,0	4,8	4,3	3,6	3,6	5,6	8,0	—	19,2	21,8	22,4	23,8	24,6	28	34	—	—	13,2
	12^{00}	50 30		2,0	2,0	2,0	2,0	2,2	3,0	3,2	3,2	3,2	3,1	3,2	6,0	9,0	14,6	20,0	22,0	23,6	24,0	24,0	23,7	—	—	—	13,2
	13^{00}	48 36		2,3	2,6	2,8	3,0	3,6	4,2	5,0	4,0	3,7	3,6	3,2	5,4	8,0	15,0	23,3	25	26	29	32	33	—	—	—	13,3
	14^{00}	43 18		2,0	2,6	2,5	2,8	3,4	4,0	4,0	3,9	3,6	3,2	3,9	6,4	10,0	16,0	24,8	27	29	31	32	32	—	—	—	14,7
	15^{30}	31 06		2,2	2,6	2,4	2,5	3,2	3,6	3,2	3,3	3,4	3,8	4,2	5,8	11,6	16,0	27	32	35	38	—	—	—	—	—	15,2
	16^{00}	26 51		3,0	3,0	3,4	3,6	4,0	—	—	—	—	—	—	10,0	14,0	24,0	38	42	44	46	—	—	—	—	—	—
	17^{00}	17 24		—	3,0	3,0	3,0	3,0	3,2	3,6	4,2	5,0	7,0	9,0	18,4	26	12	46	—	—	—	—	—	—	—	—	—
		A_2		2,3	2,5	2,5	2,5	3,1	3,7	3,7	3,7	3,5	3,5	3,7	5,9	9,5	14,5	23,0	26,0	28	—	—	—	—	—	—	—
VIII 1963	7^{30}	25°27′	Sun-flowers	3,0	3,4	3,8	4,3	5,0	7,0	8,5	8,8	8,7	8,1	7,0	11,0	17,0	23,0	27	30	32	34	35	35	36	—	—	13,8
Clear	8^{00}	30 00		2,6	2,6	3,0	3,8	4,8	6,8	8,4	8,0	7,0	6,2	6,5	10,0	13,0	18,0	22,0	25	27	28	29	30	30	—	—	14,0
	9^{00}	39 00		2,0	2,2	2,6	3,0	3,4	6,2	7,3	7,4	7,3	6,9	6,5	10,4	15,0	20,0	24,6	26	28	26	26	27	28	—	—	14,1
	10^{00}	46 48		—	2,6	3,0	3,6	4,4	6,6	8,0	8,2	7,7	7,9	6,6	10,4	13,6	19,0	21,3	22,0	22,6	24,0	24,6	25	26	—	—	14,4
	11^{00}	52 24		—	2,0	2,0	2,5	6,5	7,4	7,6	7,6	7,2	6,6	6,6	10,0	13,0	15,8	18,8	20,0	21,0	22,6	23,5	24,2	25	—	—	14,3
	13^{00}	52 24		—	2,0	2,0	2,5	3,0	7,9	7,0	7,1	7,0	6,5	6,5	10,0	11,0	18,0	21,7	23,4	25	27	28	28	29	—	—	14,2
	14^{00}	46 48																									
	15^{00}	39 00		—	3,0	3,5	2,5	3,0	5,0	6,0	6,0	6,5	6,0	7,0	11,8	14,6	17,8	22,0	23,7	25	27	28	28	—	—	—	13,0
	16^{00}	30 00		—	5,4	6,0	6,5	7,4	9,2	10,6	7,5	8,0	7,0	6,5	10,4	15,6	20,0	24,8	27	28	—	—	—	—	—	—	13,8
	17^{00}	20 18		—	5,0	5,4	5,8	6,4	10,3	12,0	12,0	12,1	—	7,0	12,0	17,0	23,0	27	29	30	—	—	—	—	—	—	—
	18^{00}	11°12′		—	—	5,6	6,0	7,6	11,0	14,0	14,0	11,0	10,0	9,0	14,0	24,0	32	36	40	41	42	—	—	—	—	—	—
		A_2		—	2,4	2,7	2,7	3,1	6,4	6,8	6,8	6,9	6,5	6,7	10,7	14,5	18,6	22,8	24,4	26	27	27	28	—	—	—	—
VIII 1963	8^{00}	33°	Tall Sudan grass	1,4	1,4	1,6	3,0	4,5	6,0	7,0	5,6	4,6	3,6	3,0	6,0	11,0	25	46	52	54	55	55	51	—	—	—	24,2
Clear	9^{00}	41°24′		2,0	2,2	2,4	3,3	4,7	6,0	6,5	4,6	3,5	2,9	2,7	4,5	8,0	26	42	50	51	52	52	52	—	—	—	21,0
	10^{00}	49 24		2,5	3,0	3,2	3,6	5,0	6,0	6,0	3,5	2,5	2,2	2,4	4,0	9,0	25	39	44	45	45	44	43	—	—	—	19,1
	12^{00}	57 30		1,8	2,0	2,4	2,3	4,0	5,0	5,5	3,4	2,7	3,0	3,0	7,0	13,0	27	41	46	48	46	45	43	—	—	—	19,1
	13^{00}	52 36		2,6	2,8	2,8	2,8	4,0	5,0	5,6	3,8	3,2	3,8	3,6	6,0	14,0	27	43	49	51	51	—	—	—	—	—	20,9
	14^{00}	49 24		—	2,8	3,0	3,6	5,0	7,0	7,0	5,4	4,5	4,0	4,8	7,0	12,0	30	43	48	50	50	48	47	—	—	—	21,4
	15^{00}	41 24		2,4	2,4	3,0	3,4	5,0	7,0	7,2	6,0	4,8	4,2	3,8	6,0	11,0	31	47	52	55	56	56	56	—	—	—	22,6
	16^{00}	33		2,5	3,0	3,0	3,6	5,0	6,5	7,0	5,8	4,1	4,6	3,9	6,0	12,0	32	46	53	56	59	59	59	—	—	—	22,0
		A_1		2,2	2,4	2,6	3,2	4,6	6,0	6,4	4,8	3,8	3,5	3,4	5,8	11,2	28	43	49	51	52	51	50	—	—	—	—
		A_2		2,1	2,2	2,6	3,0	4,6	6,0	6,4	4,7	3,7	3,4	3,2	5,8	10,7	28	43	49	51	51	51	50	—	—	—	—
IX 1963	9^{00}	33°06′	Ripe corn (yellow)	—	—	—	—	8,6	10,0	11,2	11,8	12,0	12,6	13,0	14,0	17,8	21,6	26	27	28	—	—	—	—	—	—	16,6
Clear	10^{00}	40 30		—	—	—	—	—	8,4	9,2	9,2	9,6	10,2	11,0	13,0	14,6	17,0	20,4	[illegible]	22,8	—	—	—	—	—	—	15,1
	11^{00}	45 33		—	—	—	—	8,6	9,2	9,8	10,6	11,0	11,0	12,0	14,2	16,0	17,4	20,0	22,0	23,1	25	26	26	28	—	—	15,0
	12^{00}	47 24		—	—	—	—	9,2	9,9	10,5	11,2	11,9	12,3	14,1	16,3	18,2	19,9	22,2	23,9	24,9	—	—	—	—	—	—	15,2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	2[illegible]
IX 1963 Clear	13^{00}	45 36′	Ripe corn (yellow)	—	—	—	—	9,8	10,6	11,2	11,8	12,4	13,0	16,6	[illegible]	18,6	20,4	22,4	24,0	25	—	—	—	—	—	—	[illegible]
	14^{00}	40 30		—	—	—	—	8,0	8,0	12,0	10,2	10,8	12,0	14,8	15,6	19,0	23,4	26	27	28	30	30	—	—	—	—	17,1
	15^{00}	33 06		—	—	—	—	—	13,6	13,8	14,0	14,4	14,8	17,6	20,1	22,6	25	27	28	29	31	32	32	—	—	—	17,1
	16^{00}	24 24		—	—	—	—	—	13,2	14,0	14,8	15,0	17,0	20,0	24,0	26	29	32	35	38	43	46	48	—	—	—	19,0
		A_2		—	—	—	—	—	11,2	11,8	12,3	12,8	13,2	14,9	16,9	19,5	22,2	25	26	27	—	—	—	—	—	—	—
VIII 1963 Clear	9^{00}	47 00′	Millet	—	—	—	—	9,0	9,4	9,8	10,0	10,0	10,0	10,2	16,0	23,0	28	32	34	35	37	37	38	39	—	—	18,8
	12^{00}	57 30		—	—	—	—	6,0	8,0	9,0	9,6	10,0	10,0	9,6	12,6	18,4	22,0	27	30	32	34	35	36	40	—	—	17,7
	15^{00}	47 00		—	—	—	—	—	7,8	9,0	9,6	10,0	10,0	10,2	14,0	20,0	25	31	33	35	38	39	40	42	—	—	21,4
		A_2		—	—	—	—	7,5	8,4	9,3	9,7	10,0	10,0	10,0	14,2	20,5	25	30	32	34	36	37	38	40	—	—	—
VII 1962 clear	7^{00}	25 40′	Grain stubble	—	4,2	5,6	7,0	8,6	10,3	12,3	13,4	12,6	15,2	16,0	18,0	—	—	—	—	—	—	—	—	—	—	—	—
	8^{00}	36 00		—	4,3	5,3	6,4	7,6	8,9	10,3	12,2	9,6	—	16,0	18,0	—	21,5	24,5	26	27	29	29	30	32	34	35	19,2
	9^{00}	45 10		—	3,5	5,3	6,0	7,4	9,0	9,8	7,9	—	14,5	15,0	17,5	—	21,0	24,0	25	26	28	28	29	31	31	32	18,5
	10^{00}	55 25		—	2,7	4,2	5,8	7,2	8,6	9,0	9,3	9,1	14,5	15,0	17,5	—	21,0	23,0	25	26	28	28	29	31	32	33	19,2
	11^{00}	62 30		—	3,1	4,2	5,2	6,3	7,7	8,2	8,8	8,2	15,0	15,5	18,0	—	21,0	24,0	25	27	29	29	30	31	31	32	18,1
	12^{00}	65 00		—	3,9	4,7	5,3	6,1	7,1	8,0	8,4	8,4	14,0	15,0	17,0	—	20,0	22,5	24,0	25	27	28	29	30	31	31	18,1
	13^{05}	62 30		—	3,4	3,8	4,5	5,3	6,2	7,0	7,6	7,7	14,0	15,0	17,0	—	20,2	22,5	24,0	25	27	28	30	31	32	34	18,8
	14^{00}	55 25		—	3,7	4,7	5,6	6,4	7,3	8,1	8,5	7,8	13,0	14,0	16,0	—	19,0	21,0	24,0	23,5	27	27	28	—	—	—	19,8
	15^{00}	46 10′		—	3,6	4,6	5,4	6,4	7,8	8,5	8,3	8,1	15,0	16,5	19,0	—	23,0	26	28	29	31	31	31	32	33	33	20,6
	16^{00}	36		—	4,3	5,4	6,7	8,1	9,4	10,9	11,7	11,4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	22,9
		A_2		—	3,7	4,9	5,6	6,6	7,9	8,8	8,2	8,3	14,5	15,5	17,8	—	21,0	24,0	26	27	29	29	30	31	32	32	—
VII 1963 Clear	12^{00}		Straw	—	—			10,0	14,4	17,2	20,6	23,2	26	30	30	31	33	36	38	40	43	43	43	—	—	—	17,0
VIII 1963 clear	8^{00}	31 24′	Corn for silage	1,8	2,0	2,5	3,0	4,2	6,4	6,3	5,4	4,4	3,8	3,8	6,0	12,0	19,5	32	35	36	38	38	38	38	—	—	18,5
	9^{00}	40 33		2,0	2,2	2,5	2,8	4,0	6,0	6,0	5,2	4,1	3,8	3,8	6,2	12,0	18,0	30	32	34							
	10^{00}	48 30		2,0	2,4	2,6	2,8	4,0	5,5	5,4	4,8	4,1	4,0	3,8	6,5	9,0	16,8	25	29	31	32	—	—	—	—	—	15,6
	11^{00}	51 12		2,0	2,2	2,4	2,6	3,4	5,0	5,4	5,0	4,2	4,0	4,2	8,0	14,0	22,0	29	34	36	37	—	—	—	—	—	16,0
	12^{00}	56 24		2,3	2,6	2,8	3,2	4,2	5,4	5,8	5,2	5,3	4,3	4,5	8,0	11,0	16,0	25	28	30	31	—	—	—	—	—	15,0
	13^{00}	51 12		1,8	2,4	3,0	3,4	5,2	6,6	6,6	5,8	5,0	4,3	4,5	8,0	13,0	21,6	28	30	31	32	—	—	—	—	—	15,4
	14^{00}	48 30		2,6	3,2	3,6	3,8	5,0	6,8	6,8	6,0	5,2	4,6	5,2	7,0	11,0	16,7	27	30	31	32	—	—	—	—	—	16,0
	15^{00}	40 33		1,2	2,0	2,4	2,8	4,3	5,0	5,0	4,6	4,8	5,0	5,0	10,0	15,0	—	30	33	36	—	—	—	—	—	—	17,4
	16^{00}	31 24		3,0	3,8	4,0	4,4	5,5	7,4	7,0	5,6	5,0	4,8	4,5	8,0	17,0	19,5	29	33	36	—	—	—	—	—	—	19,1
	17^{00}	21 42		2,0	2,8	3,4	3,6	5,0	8,0	8,8	8,6	7,6	6,2	7,5	13,0	21,0	33	48	52	53	—	—	—	—	—	—	19,0
VIII 1963 10/10 Sc 2/0 Cc	8^{00}	30 00′	Mowed grass	2,0	2,5	3,0	2,8	3,8	4,4	4,8	4,9	4,8	5,1	6,2	8,4	10,0	11,2	13,0	14,6	15,6	17,0	18,0	18,8	20,1	—	—	—
	9^{00}	39 00		3,9	5,0	5,2	5,4	5,3	5,9	6,4	6,5	6,6	6,6	7,3	9,0	11,0	12,3	13,9	15,0	16,2	17,6	18,2	18,8	19,4	—	—	11,5
	12^{00}	51 30		2,8	3,0	3,6	3,9	5,9	7,3	7,2	7,0	7,0	7,0	7,2	9,0	10,6	12,8	14,2	15,8	16,8	18,3	19,0	19,8	20,8	—	—	—
VIII 1963 Clear	13^{00}	52 24′	Same	4,2	5,6	6,4	7,0	7,8	8,0	7,8	7,6	7,4	7,4	7,6	9,0	10,6	12,4	14,0	15,2	15,8	16,6	19,9	20,4	21,1	—	—	11,8
	15^{00}	39 00		—	—	—	—	9,0	8,2	8,4	7,7	7,4	7,6	8,2	10,6	12,4	14,6	16,1	18,0	19,0	20,4	20,8	21,0	21,4	—	—	14,1
	16^{00}	30 00		—	—	—	—	10,0	10,4	10,6	10,4	10,2	10,2	10,0	12,2	14,0	17,3	20,0	21,8	23,2	—	—	—	—	—	—	16,1
	17^{00}	20 24		—	—	—	—	12,2	13,4	13,2	13,0	13,0	13,4	14,2	18,4	23,4	28	31	33	35	37	37	37	—	—	—	17,5
		A_2		—	—	—	—	6,7	7,1	7,3	7,0	7,0	7,1	7,6	9,5	11,3	13,2	14,7	16,2	17,2	18,8	19,8	20,1	20,5	—	—	—
[illegible] Clear	[illegible]	9 50′	Bare soil	—	—	—	—	5,5	5,5	7,2	7,7	7,9	8,0	7,5	12,0	14,5	15,2	16,4	17,5	18,6	20,0	20,4	20,5	[illegible]	20,2	20,0	—
	8^{00}	21 30		—	—	—	—	5,8	5,8	6,5	7,0	6,8	6,8	6,8	11,0	12,3	14,0	15,5	16,7	17,8	19,3	20,1	20,8		21,0	20,8	—
	9^{00}	31 00		—	—	—	—	—	5,2	6,0	6,0	6,6	6,7	6,2	9,5	10,8	12,5	13,7	14,8	15,7	17,0	17,4	17,8	[illegible]	19,0	[illegible]	—
	10^{00}	35 20		—	—	—	—	—	4,7	5,0	6,0	6,0	6,7	6,1	8,6	10,0	13,0	14,6	15,5	16,0	16,2	16,5	17,0	—	—	—	—
	11^{00}	40 00		—	—	—	—	—	4,8	5,0	5,4	5,8	6,0	5,6	7,0	9,5	11,7	[illegible]	15,0	15,8	16,6	17,6	17,8	18,5	19,0	18,2	—
	12^{00}	41 10		—	—	—	—	—	6,0	5,3	5,5	6,9	7,0	6,7	9,5	11,0	12,4	14,2	15,3	16,4	17,0	18,0	18,3	18,8	18,6	18,5	—
	13^{00}	40 00		—		—	—	—	5,7	6,3	6,8	7,3	7,5	7,0	10,0	11,2	13,0	15,0	15,8	16,8	18,0	18,5	18,5	19,0	19,0	18,7	
	14^{00}	35 20		—	—	—	—	—	6,5	7,2	7,6	7,7	7,8	[illegible]	10,5	13,0	14,0	15,5	16,3	17,2	19,3	19,5	19,8	19,5	19,0	18,5	—
	15^{00}	31 00		—	—	—	—	—	6,0	6,4	6,7	7,0	7,5	[illegible]	10,5	13,0	14,4	15,4	16,0	17,0	18,5	18,8	19,2	19,8	19,6	19,5	—

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
IV 1961 Clear	16[illegible]	24°30'	Bare soil	—	—	—	—	—	6,0	6,3	6,6	7,0	7,5	7,0	11,0	12,8	14,4	16,0	17,3	18,3	19,5	19,4	20,0	19,6	19,6	19,5	—
	18[illegible]	9 50		—	—	—	—	—	5,8	6,6	7,2	7,5	7,7	8,3	11,0	13,2	14,6	16,0	17,4	18,2	19,7	19,3	18,8	18,2	18,2	18,2	—
		A_1		—	—	—	—	—	5,6	6,2	6,8	6,9	7,2	6,9	9,8	11,9	13,6	15,1	16,1	16,4	18,3	18,7	18,9	19,4	19,2	19,2	—
		A_2		—	—	—	—	—	5,7	5,9	6,1	6,8	7,1	6,6	9,8	11,6	13,1	14,4	15,4	16,4	17,7	18,1	18,4	19,1	19,1	19,0	—
IX 1962 Clear	8^{20}	—	Annual grapes	3,1	3,5	4,0	4,5	5,0	5,7	6,3	6,8	7,3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	9^{05}	—		3,2	3,5	3,8	4,3	4,9	5,9	7,1	8,5	7,2	6,5	6,6	7,0	7,7	9,0	9,2	9,8	10,5	11,6	12,2	12,2	13,2	13,2	13,8	—
	10^{00}	—		3,0	3,5	3,9	4,4	5,0	5,8	6,4	7,0	7,2	7,1	7,0	8,3	8,9	9,4	10,4	11,2	12,2	13,5	14,0	14,2	14,5	14,7	15,0	—
	11^{07}	—		2,9	3,4	3,8	4,3	5,0	5,7	6,2	6,3	6,0	6,8	7,4	9,0	9,5	10,0	11,2	12,0	12,8	13,8	14,0	14,2	14,2	14,2	14,0	—
	12^{00}	—		3,1	3,3	3,8	4,1	4,6	5,2	5,7	6,2	6,4	6,0	7,0	8,3	9,0	9,5	10,5	11,2	12,0	13,0	13,4	13,6	14,2	14,2	14,5	—
	12^{30}	—		2,6	3,0	3,2	3,5	3,9	4,6	5,2	5,5	6.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	14^{00}	—		2,6	3,4	3,5	3,9	4,4	5,0	5,6	6,1	6.0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
	15^{25}	—		2,7	3,2	3,8	4,3	4,8	5,4	6,0	6,7	7,0	7,0	7,2	9,0	9,2	10,0	11,0	11,4	12,6	13,5	14,0	14,2	14,3	14,6	14,5	
	16^{00}	—		3,1	3,5	3,9	4,2	4,9	5,7	6,2	6,5	6,2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	16^{50}	—		3,6	4,1	4,4	4,9	5,6	6,5	7,5	8,9	8,8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
		A_2		3,0	3,3	3,8	4,2	4,7	5,5	6,3	7,1	6,9	6,5	6,9	8,1	8,6	9,5	10,2	10,8	11,7	12,7	13,2	13,3	13,9	14,0	14,3	-
IX 1963 Clear	13^{00}	—	Winter wheat	3,8	4,3	4,6	5,0	5,4	6,6	7,4	7,2	7,0	7,2	7,8	10,4	11,6	12,6	14,0	15,6	17,2	19,4	20,2	21,0	21,8	—	—	12,4
IX 1962 Clear	8^{00}	24°42'	Biennial grapes	2,7	2,8	3,1	3,4	4,4	5,5	5,6	5,5	5,2	6,1	6,8	15,0	21,6	22,3	27	29	30	31	31	31	31	31	31	—
	9^{00}	34 00		2,7	3,3	3,6	4,1	5,2	6,2	6,8	6,7	6,0	6,0	6,0	13,0	17,5	19,5	21,0	22,0	26	29	29	29	30	29	29	—
	10^{00}	41 54		2,8	3,0	3,2	3,4	4,3	5,1	5,5	5,4	5,1	5,0	5,1	—	—	—	—	—	—	—	—	—	—	—	—	—
	11^{00}	47 24		2,7	2,8	3,0	3,2	4,1	4,9	5,0	4,6	5,0	5,3	5,8	—	14,0	16,2	19,8	22,8	25	28	28	28	27	25	25	—
	12^{00}	49 30		2,7	2,9	3,0	3,3	4,1	5,0	5,2	5,2	5,0	5,0	5,2	—	14,4	16,6	22,0	23,6	25	27	28	28	29	29	29	—
	13^{00}	47 24		2,7	2,9	3,0	3,2	4,0	4,7	5,1	5,0	4,7	5,0	5,4	—	12,0	16,6	19,8	22,8	24,3	26	26	25	24,0	21,0	23,0	—
	14^{00}	41°54'		2,7	2,5	3,1	3,2	4,0	4,8	5,3	5,4	4,8	5,9	7,0	11,5	14,6	16,4	19,8	22,0	24,0	26	26	26	26	26	25	-
	15^{00}	31 00		2,7	2,4	3,0	3,3	4,1	4,9	5,3	5,3	5,2	6,8	7,5	15,0	17,2	18,3	19,9	21,0	24,8	26	27	27	28	28	28	-
	16^{00}	24 42		3,2	3,4	3,5	3,7	4,5	5,9	6,4	6,3	6,2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	-
	17^{00}	14 39		2,8	3,2	3,6	4,4	5,6	7,7	7,3	7,0	6,5	—	—	—	—	—	—	—	—	—	—	—	—	—		-
		A_1		2,8	2,9	3,2	3,4	4,4	5,5	5,7	5,6	5,4	5,8	6,2	—	15,9	18,0	21,4	23,4	26	28	28	28	28	27	27	--
		A_2		2,7	2,9	3,2	3,6	4,4	5,4	5,8	5,7	5,4	6,3	6,6	—	16,4	18,1	20,9	22,2	25	27	27	27	27	27	27	...
IX 1962 Clear	7^{12}	14°40'	Fruit-bearing grapes	2,3	2,7	2,9	3,3	5,2	7,3	6,8	6,3	5,6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	--
	8[illegible]	24 42		2,2	2,5	2,7	2,9	4,6	6,3	5,6	4,5	4,1	3,0	3,0	5,0	10,0	17,5	24,0	27	27	27	27	27	25	26	27	--
	9^{12}	31 00		2,1	2,1	2,6	2,7	4,4	5,7	5,3	4,9	3,8	4,0	3,5	8,0	13,0	20,0	29	32	33	32	33	32	31	32	31	--
	9^{55}	42 00		2,0	2,1	2,2	2,4	3,8	4,7	4,3	3,7	3,4	3,0	3,0	5,0	10,0	19,5	25,0	28	27	29	30	28	—	23	25	
	11^{03}	47 24		2,3	2,4	2,6	2,6	3,9	4,9	4,7	4,2	3,7	4,5	4,0	7,0	11,0	—	20,0	23,0	25	27	—	—	27	25	27	—
	12[illegible]	49 30		2,3	2,3	2,3	2,4	3,9	5,0	4,7	4,2	3,9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	13[illegible]	47 24		2,0	2,2	2,4	2,7	3,9	4,9	4,6	4,0	3,6	3,5	3,5	6,5	11,5	13,0	23,0	25	26	29	30	30	30	—		—
	13^{55}	42 00		2,2	2,4	2,3	2,7	4,0	5,2	4,9	4,3	3,9	4,0	4,0	4,0	8,0	12,0	18,0	23,5	26	28	28	29	28	28	28	
	15[illegible]	34 00		2,2	2,6	2,7	2,9	4,3	5,8	5,4	4,5	4,0	—	—	—	—	—	—	—	—	—	—	—	—	—	...	
	15^{55}	24 42		2,2	2,8	2,8	3,1	4,8	6,3	5,8	5,0	4,3	—	—	—	—	—	—	—	—	—	—	—	—	—	...	
	17[illegible]	14 40		2,2	2,2	2,7	3,0	4,7	6,5	5,7	5,2	4,9	3,8	5,6	6,0	7,0	18,0	20,0	23,0	25	29	29	30	30	—	30	
		A_1		2,2	2,4	2,6	2,8	4,3	5,7	5,2	4,6	4,1	—	—	—	—	—	—	—	—	—	—	—	—	—		—
		A_2		2,2	2,3	2,5	2,7	4,2	5,5	5,1	4,5	3,9	—	—	—	—	—	—	—	—	—	—	—	—	—		—
VI[illegible] Clear	8[illegible]	31°24'	Tall corn	—	4,7	4,6	4,5	4,8	6,2	7,6	6,5	6,0	5,0	5,0	8,6	11,0	16,0	20,6	22,8	23,8	24,8	25	25	25	—	—	
	9[illegible]	40 33		—	5,0	5,1	5,2	7,0	6,6	7,0	9,0	8,3	7,8	7,3	9,0	11,6	[illegible]	25	27	27	28	29	29	29	—	—	14,0
	10^{00}	48 30		—	5,4	5,6	6,0	6,6	9,6	10,8	0,5	10,0	9,0	7,0	10,0	13,0	[illegible]	23,6	26	27	28	27	26	23,8	—	.	14,0
	11[illegible]	54 12		—	—	—	—	9,6	9,3	9,0	8,8	8,7	8,5	8,8	12,0	15,0	17,0	21,0	23,8	24,8	27	28	29	30	—	.	14,4
	12[illegible]	56 24		—	3,6	3,8	4,2	5,0	7,6	8,3	8,0	7,6	7,3	7,3	10,8	14,0	18,0	21,0	[illegible]	29	28	29	29	—	.		[illegible]
	13[illegible]	54 12		—	—	—	—	—	9,6	9,0	8,8	8,5	8,5	8,5	12,0	15,0	21,0	[illegible]	[illegible]	29	30	30	30	30	—	—	14,1
	15^{00}	40 33		—	—	—	—	7,0	8,0	8,5	9,0	8,8	8,7	8,5	10,8	13,6	22,0	26	29	29	29	29	28	—	—	—	16,[illegible]
		A_2		—	—	—	—	6,3	7,4	7,9	8,7	8,2	7,9	7,7	10,2	12,8	20,0	25	28	28	28	29	28	—			

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
VIII 1963 Clear	12^{00}	52 36′	Bulgarian pepper	—	—	—	—	—	6,6	6,8	7,0	6,4	6,1	7,0	10,0	13,0	16,0	19,0	21,8	23,1	—	—	—	—	—		[illegible]
	13^{00}	59 30		—	—	—	—	—	6,0	6,4	7,0	7,1	7,0	7,8	12,0	15,0	19,6	23,9	25	27							13,2
	14^{00}	45 30		4,8	4,7	4,4	5,2	5,2	6,0	6,0	7,0	7,2	7,2	7,6	10,6	11,0	19,0	22,0	25	26	—	—		—	—		13,4
	15^{00}	37 24		4,2	4,2	4,6	5,0	5,6	6,4	7,0	7,7	7,7	7,0	7,0	9,0	11,3	19,4	25	28	29	—			—	—		14,3
	16^{00}	28 24		5,0	5,1	6,0	6,0	6,8	7,3	6,8	6,6	6,8	6,8	7,2	12,0	16,0	23,0	26	29	29	31	32	32	—	—	—	15,4
	17^{00}	18 48		6,0	6,8	7,4	8,0	9,0	9,0	8,6	8,1	7,9	8,0	12,0	16,0	24,0	24,6	27	28	—	—	—	—	—	—	—	15,9
VIII 1963 Clear	12^{00}	52 36	Tomatoes	—	—	—	4,6	5,4	7,2	7,8	7,4	6,6	6,4	6,8	9,0	13,0	22,4	26	29	30	32	32	—	—	—	—	14,[illegible]
	15^{00}	50 30		—	—	—	—	—	—	7,2	7,0	6,4	6,2	6,4	9,8	13,8	22,2	28	31	33	—	—	—	—	—	—	15,0
VIII 1963 Clear	14^{00}	45 36	Same	—	—	—	—	—	8,0	8,2	8,0	7,8	7,2	6,5	9,8	13,2	20,2	27	30	31	—	—	—	—	—	—	15,5
	15^{00}	37 24		—	—	—	—	—	—	7,6	8,0	8,0	8,0	7,0	12,1	18,0	33	40	43	43	—	—	—	—	—	—	16,0
	16^{00}	28 24		—	—	—	—	—	—	—	—	—	—	—	20,4	27	40	45	57	60	—	—	—	—	—	—	17,9
30 I 1963 10/3 Sc, Ac	10^{00}	9°36′	Loose clear snow	68	69	71	72	74	74	74	74	74	75	76	76	—	76	76	76	76	77	77	77	75	75	74	72
7,7 Sc	12^{00}	13 30		59	62	66	67	72	73	73	73	74	75	76	76	—	75	75	76	75	75	75	74	68	65	61	71
10 7 Sc, Ac	13^{00}	12 30		68	71	74	76	79	80	80	80	80	80	80	81	—	81	81	81	80	80	79	79	77	76	75	70
8,0 Ac	14^{00}	9 36		—	75	77	78	79	79	79	79	80	81	82	83	—	84	81	84	84	82	81	80	77	74	71	70
10,0 Ac	15^{00}	5 06		73	75	76	77	78	78	77	77	77	78	79	79	—	79	79	78	78	76	76	75	72	71	70	70
		A_2		64	69	71	72	75	75	75	75	76	77	78	78	—	78	78	79	78	78	78	77	73	71	69	—
31 I 1963 10 9 Sc	10^{00}	9°36′	Freshly fallen snow	68	76	80	85	89	90	91	91	91	92	92	92	—	91	90	90	90	90	90	90	87	85	80	—
7 7 Sc	11^{00}	12 30		77	80	84	87	90	92	92	92	92	92	92	93	—	92	92	92	92	92	91	90	88	85	84	—
10 10 Sc	12^{05}	13 30		62	67	71	75	78	81	82	82	83	84	84	81	—	84	84	81	84	81	81	81	81	79	75	—
10 10 Sc	12^{55}	12 30		—	—	—	—	75	75	76	76	78	78	79	80		80	80	80	80	80	80	80	78	76	74	—
10 10 Sc	11^{55}	5 05		—	—	—	—	74	74	75	76	78	78	78	79		79	79	79	79	78	78	78	78	78	77	—
		A_2		—	—	—		80	82	83	83	84	85	85	85		85	84	84	84	81	84	84	82	81	77	—
31 I 1963 10 10 Sc	9^{57}	—	Same	—	—	—	—	—	81	80	82	82	81	79	78	78	79	79	79	79	78	78	78	77	—	—	—
	10^{30}	—		—	—	—	—	—	83	82	82	82	82	82	80	80	80	80	80	80	79	79	79	78		—	—
	10^{53}	—		—	—	—	—	—	83	84	83	84	83	83	83	83	82	82	81	80	78	76	76	75		—	—
	11^{18}	—		—	—	—	—	—	82	81	83	83	83	33	83	83	83	82	81	81	80	80	80	80		—	—
	12^{16}	—		—	—	—	—	—	83	83	83	82	83	82	81	80	81	81	80	80	79	79	79	76		—	—
	13^{00}	—		—	—	—	—	—	88	85	85	85	85	85	85	84	84	81	82	82	82	82	82	80		—	—
	14^{35}	—		—	—	—	—	—	81	80	81	81	81	80	80	80	80	80	80	80	78	78	78	77	—	—	—
	15^{00}	—		—	—	—	—	—	86	86	85	85	86	86	85	85	84	83	82	82	79	78	78	77		—	—
	16^{00}	—		—	—	—	—	—	81	77	80	81	80	81	80	81	81	81	81	81	80	80	80	78		—	—
12 II 1961 10 10 Sc	8^{30}	—	Same	—	—	—	—	86	83	85	86	87	87	87	87	87	86	86	86	86	85	85	84	83	79	—	—
	10^{00}	—		—	—	—	—	84	86	84	81	85	84	81	84	84	83	83	82	82	80	79	78	71	—	—	—
	10^{25}	—		—	—	—	—	91	87	88	87	86	85	85	85	85	86	85	85	85	81	83	82	78		—	—
	11^{00}	—		—	—	—	—	83	86	85	84	84	84	83	82	82	82	82	83	82	82	81	80	76		—	—
	12^{55}	—		—	—		—	—	85	81	83	83	83	83	83	82	82	81	81	81	80	80	79			—	—
	14^{00}			—		—	—	87	86	86	85	86	87	87	87	87	87	87	86	86	86	85	—	—			—
		A_2		—		—	—	86	86	85	81	85	85	85	85	85	84	84	83	83	82	81	78	—	—		—
22 II 1963 Clear	10^{00}	15°30′	Dry grainy snow	86	88	91	95	96	96	96	96	95	95	95	94		94	94	94	94	93	93	92	88	86	83	—
	12^{00}	19 30		86	86	88	88	88	89	88	88	87	88	88	83		88	88	87	87	86	85	82	76	73	75	—
	13^{00}	18 45		90	—	—	—	—	—	—	—	—	—	—			90	89	89	88	88	88	88	83	87	85	—
	14^{00}	15 30		88	88	88	88	88	89	89	89	89	88	88	88		87	87	86	86	85	85	83	78	79	74	—
	16^{00}	5 30		—	—	80	82	82	82	82	80	80	80	80	80		80	80	82	82	83	82	81	77	75	73	—
		A_2		86	87	89	90	91	91	91	91	90	90	90	90		90	90	89	89	88	88	85	81	79	75	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
23 II 1963 10,10 Sc	8^{00}	—	Freshly fallen snow	—	—	—	—	—	—	91	89	87	85	84	81	—	84	84	84	84	86	85	85	80	74	70	72
	9^{00}	—		—	91	88	84	82	82	81	81	81	82	82	82	—	82	82	82	82	82	81	89	76	74	72	81
	10^{00}	—		88	81	82	81	81	82	83	83	84	81	84	81	—	81	84	81	81	81	81	83	80	76	74	[illegible]
	11^{00}	—		82	80	80	80	80	80	81	82	82	83	83	82	—	82	81	80	80	78	78	77	72	69	65	81
	12^{00}	—		75	77	78	78	77	77	77	77	77	78	78	78	—	78	78	78	78	79	79	78	74	70	68	82
	14^{00}	—		64	74	80	81	82	82	82	89	80	79	79	78	—	77	76	76	76	76	76	76	74	71	68	81
	15^{00}	—		82	81	81	80	80	81	81	82	82	82	82	82	—	82	82	82	82	81	81	80	78	76	75	79
	16^{00}	—		—	—	75	77	78	78	78	78	78	79	80	80	—	80	80	80	79	78	78	77	72	70	66	—
		A_2		—	83	82	81	80	80	80	80	80	81	81	81	—	81	81	81	81	81	80	79	78	73	72	—
5 III 1963 10,10 St	8^{00}	—	Same	—	88	87	86	83	82	80	80	80	80	80	80	—	80	80	80	79	78	76	74	70	68	66	73
	9^{00}	—		78	80	79	78	78	77	77	76	76	75	75	75	—	74	74	74	74	73	72	71	69	69	68	75
	10^{00}	—		81	82	83	84	84	83	82	82	82	82	81	81	—	80	80	80	79	78	78	78	—	—	—	77
	11^{00}	—		78	78	78	78	78	79	79	80	80	81	81	81	—	80	80	80	79	78	77	76	75	74	74	78
	12^{00}	—		75	75	76	76	75	74	74	74	74	74	75	75	—	75	74	74	74	74	73	72	70	69	67	78
	13^{00}	—		76	77	77	77	77	77	77	77	77	77	77	77	—	76	76	75	74	72	71	70	67	67	66	78
	15^{00}	—		73	75	76	77	78	78	79	79	79	80	79	79	—	79	78	78	78	78	78	77	76	76	75	76
	16^{00}	—		—	—	78	80	80	80	80	80	82	82	83	83	—	83	84	84	84	84	84	83	81	80	—	77
		A_2		75	77	77	77	77	76	76	76	76	76	76	76	—	76	75	75	75	75	74	73	72	71	70	—
28 III 1963 Clear	10^{00}	28°30′	Same	91	91	91	90	90	91	92	93	94	94	95	91	—	93	93	92	92	91	90	89	85	84	78	67
	11^{00}	31 40		92	93	94	94	91	94	94	94	94	94	94	94	—	95	94	94	94	92	90	88	82	80	78	70
	12^{00}	32 40		95	95	95	95	95	95	94	94	94	94	95	95	—	94	93	92	92	90	89	88	84	82	—	67
	13^{00}	31 40		88	87	87	86	86	86	87	88	88	88	88	88	—	88	88	88	88	86	86	85	83	82	81	67
	14^{00}	28 30		85	86	86	86	85	86	86	86	87	87	87	87	—	86	86	86	85	83	82	81	78	77	76	65
	15^{00}	23 30		82	83	83	81	81	84	84	85	85	85	84	83	—	83	83	82	81	80	80	79	78	77	76	65
	16^{00}	17 20		82	83	83	84	84	81	83	83	83	83	82	82	—	82	82	82	81	81	80	80	80	79	79	64
	17^{00}	10 20		86	85	85	85	85	85	86	86	87	87	87	86	—	86	86	85	85	83	82	—	—	—	—	61′
		A_2		89	90	90	90	90	90	90	91	91	91	91	91	—	90	90	89	89	87	86	85	82	81	77	—
29 III 1963 Clear	8^{00}	17°09′	Clear packed snow	90	90	91	92	91	94	91	95	95	95	95	95	—	95	95	94	94	92	89	86	80	78	75	—
	9^{00}	23 27		88	88	89	89	89	89	89	90	90	90	90	90	—	90	89	89	89	89	87	85	80	77	75	—
	10^{00}	28 33		87	88	88	88	89	89	89	90	90	89	89	89	—	89	88	88	88	86	85	83	77	75	72	—
	11^{00}	31 54		91	92	92	92	93	93	93	93	93	94	91	94	—	94	93	93	92	91	90	89	86	84	82	—
	14^{00}	28 33		81	81	81	82	82	82	82	82	82	82	82	82	—	82	82	82	82	81	80	78	73	70	66	—
	15^{00}	23 27		79	79	80	80	80	80	80	80	80	80	79	79	—	79	79	78	78	76	75	72	66	62	58	—
	16^{00}	17 09		80	81	82	82	82	82	82	81	81	80	80	79	—	79	79	78	78	76	74	72	66	62	58	—
	17^{00}	9 56		—	74	77	77	78	79	80	81	81	82	82	82	—	82	81	81	80	80	—	—	—	—	—	—
Clear		A_2	Dry freshly fallen snow	86	87	89	90	91	91	91	91	90	90	90	90	—	90	90	89	89	88	88	86	81	79	—	66
Clear		A_2	Wet freshly fallen snow	86	86	87	87	87	87	87	87	88	88	83	88	—	88	87	87	86	85	81	82	71	70	—	72
[illegible] 10 St		A_2	Freshly fallen snow	—	—	—	—	—	84	84	81	81	81	81	83	—	83	82	82	82	81	80	80	—	—	—	—
10,10 St		A_2	Wet freshly fallen snow	73	74	71	75	76	75	76	76	76	76	76	76		76	76	75	75	74	74	73	71	70	—	76
10,10 St		A_2	Wet snow	—	—	69	70	69	69	69	70	70	70	70	[illegible]		70	69	68	68	[illegible]	61	[illegible]	—	—	—	70

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
VII 1963	8^{00}	35°48′	Water surface (lake)	8,5	9,0	9,4	10,0	11,0	11,0	11,0	11,0	11,0	9,0	10,6	10,0	12,2	11,8	9,2	12,0	9,0	9,0		—	—	—	—	6,4
Clear	9^{00}	44 00		5,6	6,4	7,6	9,0	10,0	11,0	12,0	12,6	12,6	12,4	12,0	11,0	11,0	10,6	10,0	9,0	8,1	7,0	6,8	6,0	5,0	4,0	—	6,4
	11^{00}	56 25		4,5	6,0	6,6	7,0	7,0	7,4	7,4	7,4	7,0	6,1	6,0	5,0	4,6	4,0	3,0	2,4	2,0	—	—	—	—	—	—	6,6
	12^{00}	58 24		4,0	4,4	4,6	4,8	5,0	5,2	5,6	5,6	5,2	5,1	5,4	4,6	4,6	4,0	4,0	4,0	3,6	3,2	—	—	—	—	—	6,5
	13^{00}	56 25		6,0	6,4	6,8	7,4	8,0	8,0	7,8	7,6	7,0	6,6	6,0	5,0	5,0	4,2	4,0	3,8	3,6	3,0	—	—	—	—	—	—
	15^{00}	44 00		5,0	5,4	6,0	6,4	6,6	7,0	7,0	7,0	6,5	6,0	6,0	6,0	5,6	5,0	4,6	4,0	4,0	—	—	—	—	—	—	6,6
	17^{00}	27 36		8,0	8,4	9,0	9,4	10,6	10,6	11,0	11,8	12,2	12,4	12,0	11,4	11,2	11,0	10,1	9,5	8,5	6,8	—	—	—	—	—	8,2
		A_2		4,9	5,4	6,1	6,7	7,2	7,8	8,2	8,4	8,1	7,9	7,8	7,2	7,0	6,5	6,2	5,7	5,3	—	—	—	—	—	—	—
		A_1		5,0	5,7	6,3	6,9	7,3	7,7	8,0	8,0	7,7	7,4	7,1	6,3	6,2	5,6	5,1	4,6	4,3	—	—	—	—	—	—	—
V 1961	7^{30}	31°20′	Asphalt	—	—	—	—	—	13,7	14,6	15,4	16,1	16,8	17,5	18,3	18,5	18,8	19,5	20,0	20,5	21,6	22,3	22,4	22,7	22,7	22,7	—
9,9 Sc	9^{00}	38 10		—	—	—	—	—	13,3	14,3	15,0	15,6	16,0	16,5	17,0	17,2	17,5	18,2	18,7	19,1	20,0	20,0	19,9	19,6	19,6	19,6	—
9,9 Sc	10^{00}	43 40		—	—	—	—	—	12,4	13,7	15,0	15,8	16,4	17,2	17,8	18,1	18,5	19,2	19,6	20,0	20,3	20,5	20,5	20,4	20,4	20,5	—
6,6 Sc	11^{05}	47 40		—	—	—	—	—	12,0	13,5	14,5	15,0	15,5	15,8	16,2	16,4	16,5	16,6	16,6	16,5	16,5	16,5	—	—	—	—	—
6,6 Sc	12^{00}	48 10		—	—	—	—	—	13,2	15,2	16,5	17,4	18,2	18,7	19,2	19,3	19,5	19,8	20,4	20,9	21,8	22,0	22,0	22,0	22,0	24,0	—
3,3 Cu	13^{00}	47 40		—	—	—	—	—	12,0	14,1	16,1	17,6	18,6	19,6	20,6	21,0	21,7	23,0	23,8	24,7	26	26	27	27	27	27	—
3,3 Cu	14^{10}	43 40		—	—	—	—	—	12,7	14,1	15,0	15,4	15,8	16,0	16,5	16,8	17,1	17,8	18,0	18,0	18,0	18,0	18,0	18,0	18,0	18,0	—
3,3 Cu	15^{00}	38 10		—	—	—	—	—	12,8	14,5	15,7	16,3	17,0	17,7	18,3	18,5	18,8	19,4	20,2	20,5	20,6	20,6	20,6	20,5	20,5	20,5	—
3,3 Cu	16^{00}	31 20		—	—	—	—	—	13,0	14,8	16,0	16,8	17,5	18,0	18,6	18,8	19,0	19,5	19,6	20,2	21,0	21,0	21,0	21,0	21,0	21,0	—
3,3 Cu	17^{00}	23 40		—	—	—	—	—	13,4	14,7	15,7	16,6	17,3	18,0	18,6	18,8	19,2	19,8	20,3	20,7	21,4	21,4	21,4	—	—	—	—
		A_1		—	—	—	—	—	12,7	14,2	15,3	16,1	16,8	17,4	18,0	18,3	18,6	19,2	19,7	20,1	20,7	20,8	21,3	21,6	21,4	21,7	—
		A_2		—	—	—	—	—	13,1	14,7	15,7	16,4	17,1	17,6	18,2	18,3	18,6	19,1	19,8	20,2	20,8	20,9	20,8	20,7	20,7	21,4	—
VIII 1963	12^{00}	49°30′	Road	—	—	—	—	9,0	10,0	11,0	12,0	12,4	13,0	14,0	15,0	16,0	18,0	20,0	22,0	24,0	25	26	26	27	—	—	16,1
Clear				—	—	—	—	—	9,0	9,2	9,0	9,1	9,6	10,6	11,8	13,0	14,6	17,0	18,5	19,6	21,0	21,5	21,7	21,8	—	—	—
IX 1963	12^{00}	46 36	Sand	—			—	36	37	38	40	42	44	45	46	47	47	48	49	50	51	—	—	—	—	—	10
Clear																											
V 1961	10^{15}	42 40	Concrete	—	—	—	—	9,0	10	10,2	10,3	10,6	11,0	11,4	13,1	14,8	17,5	20,0	21,2	22,0	23,5	23,4	23,2	22,0	22,6	23,3	—
Clear																											
	13^{07}	47 30′		—	—	—	—	12,4	13,6	14,4	15,3	15,1	15,1	15,4	16,6	18,0	21,3	20,4	21,4	22,3	22,8	22,5	22,0	23,2	21,0	25	—
	14^{02}	43 50		—	—	—	—	15,0	15,4	15,9	16,1	16,1	16,1	16,2	17,5	18,7	19,8	21,6	22,6	23,8	25	25	25	21,3	24,8	26	—
	15^{20}	31 50		—	—	—	—	13,0	14,0	15,0	15,7	16,2	16,5	16,8	18,4	19,5	21,0	23,3	25	26	28	29	29	29	30	32	—
	16^{02}	31 15		—	—	—	—	9,5	10,9	11,0	12,5	13,2	13,2	14,0	15,5	16,8	18,7	21,7	23,5	24,0	23,3	22,6	22,3	22,5	22,5	24,5	—
	18^{12}	12 50		—	—	—	—	16,0	16,6	17,0	17,1	17,0	17,0	17,0	18,5	20,2	22,8	26	27	28	31	31	30	31	31	32	—
IX 1952	6[illegible]	3 30′	Fallow	3,0	2,9	3,2	3,9	4,1	7,6	6,6	6,0	5,7	5,6	5,9	6,3	6,4	6,6	7,1	7,7	8,3	10,0	10,5	10,9	11,4	11,8	12,2	—
Clear	7[illegible]	13 06		—	—	—	—	—	4,5	4,6	5,0	5,2	5,5	5,9	6,3	6,4	6,6	7,1	7,8	8,9	10,2	10,8	11,2	11,8	12,2	12,5	—
	8^{15}	23 00		2,2	2,4	2,5	2,7	2,9	4,3	4,4	4,2	4,5	4,9	5,3	5,7	5,9	6,5	6,6	7,1	7,7	8,9	9,6	9,9	10,5	10,8	11,2	—
	9[illegible]	32 30		3,2	3,5	3,8	3,9	4,1	3,2	6,6	4,1	4,5	5,0	5,3	5,8	6,0	6,2	6,8	7,4	8,0	9,3	9,7	9,8	10,9	12,1	12,9	
	10[illegible]	40 06		3,1	3,3	3,5	3,8	4,2	3,6	3,7	3,9	4,2	4,5	4,9	5,3	5,4	5,6	6,0	6,6	7,2	8,6	9,0	9,3	9,7	10,1	10,7	—
	11^{10}	45 30		2,8	3,1	3,5	3,9	4,1	4,4	4,7	5,5	5,4	5,7	6,3	6,8	7,0	7,3	7,8	8,6	9,2	10,7	11,5	11,8	11,8	12,0	12,2	—
	12[illegible]	47 30		2,1	2,4	2,8	3,3	3,7	5,2	5,1	5,2	5,1	5,8	6,2	6,8	7,0	7,4	7,9	8,5	9,3	10,7	11,7	12,0	12,7	12,9	13,0	—
	13[illegible]	45 30		2,8	2,9	3,2	3,5	3,8	4,6	4,8	5,3	5,7	6,0	6,5	7,2	7,4	7,8	8,3	8,9	9,6	11,3	12,2	12,6	12,6	12,7	12,9	—
	13[illegible]	40 06		3,0	3,2	3,6	4,0	4,1	3,7	3,4	4,0	4,5	4,8	5,4	5,9	6,0	6,3	6,5	7,5	8,2	9,6	9,9	10,3	10,9	10,6	11,3	—
	15^{15}	32 20		—	3,4	3,8	4,0	4,2	3,0	3,4	3,8	4,3	4,6	5,0	[illegible]	5,8	6,0	6,5	7,0	7,6	[illegible]	9,7	10,1	10,6	11,0	11,4	—
	16[illegible]	23 00		—	3,6	3,9	4,2	4,4	3,7	4,0	4,2	4,6	4,8	5,1	5,5	5,6	5,8	6,4	7,1	7,5	8,7	9,2	9,6	10,3	10,7	10,8	—
	17[illegible]	13 06		—	—	—	—	—	—	—	4,0	4,2	4,4	4,9	5,2	5,4	5,6	6,0	6,4	6,8	7,9	8,4	8,5	8,6	8,9	10,2	—
	18[illegible]	3 30		—	—	—	—	—	—	4,5	4,5	5,0	[illegible]	6,0	6,2	6,7	6,9	7,2	7,8	8,5	[illegible]	10,7	10,7	10,8	11,2	11,7	—
	A_1			2,8	3,1	3,4	3,7	4,0	4,3	4,4	4,6	4,9	5,2	5,6	6,0	6,2	6,5	6,9	7,6	8,2	[illegible]	[illegible]	10,5	10,9	11,3	11,8	—
	A_2			—	3,1	3,4	3,7	4,0	3,8	4,0	4,4	4,7	5,1	5,6	6,0	6,3	6,5	7,1	7,6	8,3	[illegible]	[illegible]	10,6	11,4	12,0	12,4	